CLAIMS

We claim:

5   1.   A method for increasing the ranging offset resolution/accuracy of a communication device attempting to adjust its upstream frequency to which it is currently tuned to match a desired frequency, comprising:

determining a frequency offset based on the difference between the actual currently tuned frequency and the desired frequency;

10   digitizing the frequency offset into a frequency offset word; and

tuning the communication device by adjusting the actual currently tuned frequency by the frequency value corresponding to the frequency offset word.

15   2.   The method of claim 1 wherein the frequency offset word is applied to a currently tuned frequency word.

3.   The method of claim 2 wherein the currently tuned frequency word resides in the communication device.

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4.   The method of claim 1 wherein the communication device is a cable modem.

5.   The method of claim 1 wherein digitizing the frequency offset

25   results in truncation, or quantization error, and wherein the truncation error is stored.

6.   The method of claim 5 wherein the stored truncation error is used to facilitate generating the frequency offset message if the offset word is to be applied to the currently commanded frequency instead of the actual

5   frequency.

7.   The method of claim 1 wherein the desired frequency is a new frequency with respect to a most recently commanded frequency.

8.   A method for increasing the ranging offset resolution/accuracy of a cable modem attempting to adjust its upstream frequency to which it is currently tuned to match a desired frequency, comprising:

determining at a CMTS the actual upstream transmission frequency of the cable modem;

determining at the CMTS a frequency offset based on the difference between the actual currently tuned frequency and the desired frequency;

digitizing the frequency offset into a frequency offset word; and

tuning the device by adjusting the actual currently tuned frequency by the frequency value corresponding to the frequency offset word.

9.   The method of claim 8 wherein the frequency offset word is applied to a currently tuned frequency word.

10.   The method of claim 9 wherein the currently tuned frequency word resides in the communication device.

11.   The method of claim 8 wherein digitizing the frequency offset results in truncation, or quantization error, and wherein the truncation error is stored.

12.   The method of claim 11 wherein the stored truncation error is used to facilitate generating the frequency offset message if the offset word is to be applied to the currently commanded frequency instead of the actual frequency.

13.   A method for reducing the upstream tuning error of a cable modem that receives a ranging frequency offset from a CMTS, the method comprising updating a software load of the cable modem with software that includes steps for adjusting the current upstream carrier frequency of the

5   modem such that the actual adjusted frequency tuned to, based on the frequency offset, is bounded by only one truncation error instead of two with respect to the desired frequency.

14.   The method of claim 13 wherein the updated software load

10   further comprises:

determining at a CMTS the actual upstream transmission frequency of the cable modem;

determining at the CMTS a frequency offset based on the difference between the actual currently tuned frequency and the desired frequency;

15   digitizing the frequency offset into a frequency offset word; and

tuning the device by adjusting the actual currently tuned frequency by the frequency value corresponding to the frequency offset word.

15.   The method of claim 13 wherein the frequency offset word is

20   applied to a currently tuned frequency word.

16.   The method of claim 15 wherein the currently tuned frequency word resides in the communication device.

25   17.   The method of claim 14 wherein digitizing the frequency offset results in truncation, or quantization error, and wherein the truncation error

is stored.

18.   The method of claim 17 wherein the stored truncation error is used to facilitate generating the frequency offset message if the offset word is to be applied to the currently commanded frequency instead of the actual frequency.